actively treated for graft-versus-host disease (GVHD). The median (range) ANC and ALC at the time of RSV diagnosis was 1.6 (0 - 11) and 0.8 (0 - 7.3), respectively. Among the 35 patients with URTI, 12 received IR while 23 did not. None of the 12 patients treated with IR progressed to LRTI. In contrast, 6 of the 23 untreated patients (24%) with URTI progressed to LRTI. Of the 31 patients with LRTI (25 initially diagnosed with LRTI and 6 patients who progressed from URTI to LRTI), there were four deaths occurring within 60 days of RSV diagnosis (two deaths directly from RSV, one from disease relapse, and one from GVHD). In patients with LRTI (25 patients with LRTI at diagnosis plus 6 patients who progressed from URTI to LRTI), RSV-related mortality was (6.4%). On univariate analysis, only the presence of GVHD significantly predicted the development of LRTI in patients with URTI (P = .028); however, the use of inhaled ribavirin had a protective effect that was marginally significant (P= .074). Early use of IR in high-risk transplant and leukemia patients can both reduce the progression from URTI to LRTI and improve the historically dismal outcomes of patients with RSV pneumonia.

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Physical Therapy during the Hemopoietic Stem Cell Transplant Process to Improve Quality of Life

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Clinical Question *(in PICO format)*
Background / Purpose of BESt Development
Hemopoietic stem cell transplant can have profound and lasting adverse effects on an individual's physical and psychological well-being *(Wolin 2010 [1a], Tsimicalis 2005 [1a], Baumann 2011 [2b], Jarden 2009 [2b])*. The HSCT treatment results in a decline in physical function functioning related to loss of muscle mass and muscle strength and muscle atrophy is associated with several transplant related problems, including immunosuppressive therapy, bed rest, and drug toxicities *(Wolin 2010 [1a], Knols 2005 [1a], Wiskemann 2008 [1b], Baumann 2011 [2b])*. The experience of the isolated environment and the stress of a life threatening illness, resulting in fatigue, anxiety, depression, and fear, may also contribute to negative effects on physical function and QoL *(Tsimicalis 2005 [1a])*.
Chemotherapy results in anemia, which can affect cardiorespiratory fitness and cause skeletal muscle atrophy and weakness. Chemotherapy toxicities can impede adequate nutrition needed to maintain muscle mass. Radiation therapy can lead to lung fibrosis, resulting in decreased pulmonary function. Cranial radiation in childhood has been strongly linked to physical inactivity during adulthood *(Wolin 2010 [1a])*. Individuals being treated for pediatric cancers, in particular, tend to experience adverse effects of treatment including impaired growth, decreased neurological and/or cardiac function, endocrine complications, osteoporosis and obesity *(Wolin 2010 [1a])*. All of these side effects can lead to a decline in physical functioning and contribute to experiences of fatigue, anxiety, and depression *(Wolin 2010 [1a])*.

P:	Among school aged children and adolescents receiving hemopoietic stem cell transplant (HSCT)
I:	does physical therapy (PT) intervention (active participation in mobility, endurance, strength exercise)
C:	compared to no intervention
O:	improve the patient's quality of life (QoL)?

In addition to the symptoms and side effects, the treatment requires prolonged isolation, which can also impede functional activity and impair psychological well-being *(Tremolada 2009 [1b])*. Activity restrictions and limited exercise options hinder the individual's ability to sustain physical function throughout this process. Mentally, the challenges pediatric patients experience while undergoing HSCT may have a long lasting impact on QoL *(Tremolada 2009 [1b])*.
Because survival rates have increased, the need to address these quality of life issues and the impact of functional impairment has grown significantly. It is important to consider not only immediate survival, but also long term recovery of this patient population. The purpose of developing this BESt was to identify interventions that can improve function and positively impact outcomes improving HSCT pediatric patients' QoL.

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Nephrotoxicity of Co-Administration of Tacrolimus and Teicoplanin in Allogeneic Hematopoietic Stem Cell Transplant Recipients

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Backgrounds: Both tacrolimus and glycopeptide antibiotics are nephrotoxic, and are frequently co-administered after hematopoietic stem cell transplantation (HSCT). The aim of this study is to evaluate the nephrotoxicity of co-administration of tacrolimus and glycopeptide antibiotic, teicoplanin, in HSCT recipients.
Patients and Methods: Sixty-seven patients who received intravenous tacrolimus and teicoplanin concomitantly for more than four days after allogeneic HSCT were retrospectively examined. Therapeutic drug monitoring (TDM) was performed in all patients both for tacrolimus and teicoplanin.
Results: The median duration of the co-administration of tacrolimus and teicoplanin was 11 days (range: 4-40). The mean serum creatinine (sCr) level tended to be elevated after the co-administration of tacrolimus and teicoplanin (from 0.69±0.26 to 0.75±0.30 mg/dL; *P*= 0.08); however, a two-fold or greater increase of sCr was observed only in 2 (3.0%) patients. Increased sCr was tolerable and reversible.
Conclusion: These results suggest that the nephrotoxicity of the co-administration of tacrolimus and teicoplanin is minimal after allogeneic HSCT if the TDM of each drug is properly applied.

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Immunogenicity of a Lived-Attenuated Japanese Encephalitis Vaccine in Children after Hematopoietic Stem Cell Transplantation

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Japanese encephalitis (JE) virus is one of the most widespread causes of viral encephalitis in Asia and western pacific. JE causes long-term neurological morbidities and mortality. National implementation of JE vaccine effectively reduces incidences of JE in Asian countries. A live-attenuated

JE vaccine (SA 14-14-2) has lesser local reaction and milder systemic side effects compared to inactivated JE vaccine. Since antibody (Ab) titers to vaccine-preventable diseases decline after hematopoietic stem cell transplantation (HSCT), therefore reimmunization recommendations have been developed for post HSCT survivors. However, there has been no recommendation for revaccination of JE vaccine in post HSCT recipients. This study aimed to measure the immunogenic response to the live-attenuated JE vaccine (SA 14-14-2) in post HSCT recipients. We enrolled patients who underwent allogeneic HSCT at least 2 years, discontinued immunosuppressive agents at least 6 months, and had no evidence of chronic GVHD. The live-attenuated JE vaccine (SA 14-14-2) was administered to the patients. JE neutralizing Ab titers were measured before JE vaccination, then at 1st, 3rd, 6th, and 12th months after vaccination by a plaque reduction neutralizing test. Patients with Ab titer less than 10 at 3rd month received a second injection at 6th month. Then, the JE titers were tested at 7th, 9th, 12th, and 18th months. Side effects of the JE vaccine were recorded by vaccine card supplied to parents or guardians. A total of 28 patients (M:F = 11:17) with a median age of 13 years (4-21 years) participated in the study. The median time from HSCT was 4.13 years (2.1-9.8 years). The underlying diseases were thalassemia (50%) and hematologic malignancies (50%). Ten patients (36%) had Ab in the preventive range before vaccination (group 1). Nine of 18 patients (50%) seroconverted at 3rd month after single JE vaccination (group 2) but only 3 of them had sustained protective Ab levels at 12th month. Nine patients remained absence of JE Ab after the 1st injection (group 3). Seven of these 9 patients (78%) seroconverted at 3rd month after 2nd JE vaccine injection which all of them could sustain the protective Ab levels at 12th month. There was no difference of lymphocyte subset (CD4, 8, 16/56, and 19) between these 3 groups. There was no incidence of systemic reaction reported in this cohort. In conclusion, post HSCT survivors had low seroconversion rate after single dose of the live-attenuated JE vaccine (SA 14-14-2). Post HSCT survivors living in or traveling to the JE endemic countries may require at least 2 doses of the JE vaccine to ensure the protective Ab level.

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A Multi-Disciplinary Approach to Identification and Treatment of Hyperglycemia on an Inpatient Hematopoietic Stem Cell Transplant (HSCT) Unit

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Background/Problem: The incidence of hyperglycemia during and after HSCT has been shown to increase length of stay as well as the risk of neutropenic infections during transplantation. Severe hyperglycemia has been shown to predict the incidence acute graft-versus-host disease. There is a paucity of literature regarding implementation of a systematic screening and intervention program within HSCT programs to proactively address hyperglycemic events and minimize the potential effects of untreated hyperglycemia.
Intervention: A multi-disciplinary "Hyperglycemia Team" reviewed the literature and implemented a comprehensive screening and intervention program. A hyperglycemic protocol was implemented on the HSCT units in 2012. All patients with at least one serum or capillary blood glucose (BG) greater than 200 mg/dL in the previous 24 hour period were identified via computer-generated reports each morning. A Certified Diabetes Educator (CDE) then screened each patient's medical record to assess whether the patient was receiving insulin therapy to treat hyperglycemia. If the patient was not receiving insulin therapy or the therapy was inadequate, the CDE would contact the primary HSCT providers to facilitate implementation or escalation of a hyperglycemic protocol and/or an endocrinology team consultation.
Results: All serum and capillary blood glucoses performed on the inpatient stem cell transplant units were analyzed for 12 months prior to (n=14780) and subsequent to (n=15138) our intervention. The incidence of BG levels > 180 mg/dL significantly decreased by 16% (p=<.0001) while the incidence of hypoglycemic events (BG levels < 60 mg/dL) requiring medical intervention significantly decreased by 42% (p=<.0001) (Figure A). The number of blood glucose levels at the target goal of 100-180 mg/dL significantly increased by 7.8% (p=<.0001).
Conclusion: A multi-disciplinary approach to the identification and treatment of hyperglycemia is essential to decrease the incidence of hyperglycemia. We concurrently achieved a significant decrease in BG levels and the incidence of hypoglycemic events requiring medical intervention.

Serum/Capillary Blood Glucose Levels on HSCT Units-Figure A

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The Effect of Communication Skills Training on Nurses' Confidence and Competence in Providing Psychosocial Support to Patients and Families

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Background: Many bone marrow transplant (BMT) patients and families report clinically significant levels of psychological distress prior to the start of treatment and afterward. Nurses generally feel confident in providing care for the physical needs of patients, but often find it more difficult to address patients' emotional concerns and report a lack of skill in this area. Supportive and patient-centered communication is an important part of nursing practice, especially with patients who are experiencing emotional and psychological distress, and disruption to social, occupational, and physical lifestyle. To address this issue, the clinical question, "Among direct care nurses, does communication skills training compared to no communication skills training, affect nurses' confidence and competence in providing psychosocial support to patients and families?" was developed. The ACE Star Model of Evidence-Based Practice Change: Knowledge Transformation (Stevens, 2012) was used for this project. A literature search was conducted. Eight articles were critically appraised and a moderate grade was assigned. Communication skills training has been shown to be effective at increasing nurses' ability to provide psychosocial support to patients, confidence in providing psychosocial support, confidence in handling conflicts and criticism, competency in communicating, and communication-related self-efficacy. Nurses also attended to the psychological and social needs of patients more effectively and reported that the skills translated well into the workplace.
Implementation: Communication skills training will be added to the Therapeutic Collaborative training for BMT nurses in the spring of 2014. This training aims to assist nurses in forming therapeutic relationships with their patients and families, addressing professional boundaries, the